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NOTE TO: DOCKET F-99-WH2P-FFFFF

SUBJECT: Results for Five Chemicals - 3MRA Model Beta Version 0.98

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For the Hazardous Waste Identification Rule (64 FR 63382), the U.S. EPA (Environmental Protection Agency) used the Multimedia, Multipathway, and Multiple Receptor Risk Assessment (3MRA) Model (beta Version 0.93) and generated preliminary draft human health results for acrylonitrile. The EPA also noted in the same FR notice that errors still persisted in the modeling system (beta Version 0.93). Subsequently, EPA continued efforts to improve the system and generated revised results using beta Version 0.98 of the Model for acrylonitrile and additional results for benzene, pentachlorophenol, mercury, and lead. This note briefly describes the organization of the results and the changes made to beta Version 0.93 to arrive at beta Version 0.98 of the Model.

A. The attached tables present results for the 2000 meters distance according to four main categories:

1. Protection Group Results. Draft chemical-specific waste concentrations identified for the three waste forms (liquids, solids, and semi-solids) for each risk Protection Group (Tables PG1 - PG3); draft chemical-specific waste concentrations identified for the five waste management unit types (landfills, waste piles, aerated tanks, surface impoundments, and land application units) for each risk Protection Group (Tables PG4 - PG8);

Risk Protection Groups Evaluated

	Protection Group 1	**Protection Group 2**	**Protection Group 3**	**Protection Group 4**
Risk Level	10^{-6}	10^{-6}	10^{-5}	10^{-5}
Human Health HQ	0.1	1	1	1
Eco HQ	1	1	1	10
Population Percentile	99	99	99	95
Probability of Protection	95	90	90	90

2. Sub-Population Results. Risk or hazard quotient estimates for each Sub-Population (residents, gardener, beef/dairy farmers, and fishers) for each risk Protection Group and the three waste forms (Tables SP1 - SP3) and the five waste management unit types (Tables SP4 - SP8);

3. Cohort Results. Risk or hazard quotient estimates for each cohort (infants, children 1- 12, and adults 13 and up) for each risk Protection Group and the three waste forms (Tables CO1 - CO3) and the five waste management unit types (Tables CO4 - CO8); and

4. Exposure Pathway Results. Risk or hazard quotient estimates for each exposure pathway (air inhalation, soil ingestion, water ingestion, crop ingestion, beef ingestion, milk ingestion, fish ingestion, shower inhalation, breast milk, all inhalation, all ingestion, all ingestion and inhalation, and groundwater total) for each risk Protection Group for the three waste forms (Tables EP1 - EP3) and for the five waste management unit types (Tables EP4 - EP8).

B. A summary of the changes made to beta Version 0.93 of the Model, which generated the previous results for acrylonitrile, and incorporated in beta Version 0.98 of the Model, are:

1. Changes in the aerated tank and surface impoundment modules so that exceedance of solubility in either the leachate or the unit causes an error that terminates the program instead of a warning that allows the program to continue. This was changed because it was felt that solubility exceedance is an indication that conditions are such that they are not within the intended range of simulation intended for the modules;

2. Changes in the National data table that turn on the functions of flow through fractured and heterogeneous media in the aquifer;

3. Changes in the National data table for the following parameters:

   - Waste root zone depth (DRZ_W) from 500 cm to 50 cm for landfill and wastepile;

   - Receptor-specific food consumption rates (CR_food) to correct a unit conversion error for body weight;

   - Mode of the soil aggregate size distribution (asdm) changed from a continuous to a user-defined distribution to better reflect the definition of this parameter in Cowherd et al. (1985); and

   - Waste silt content (Sw) updated to reflect better data source (AP-42 versus professional judgment);

4. Corrections to the ecological risk module and ELP-I to correct an error that caused a misreading of the ecological receptor group descriptors in the ELP-I; and

5. Changes to the ELP-II to correct the interpolating scheme for estimating an exemption level and to improve the methodology for estimating risk or hazard quotient for sub-populations, cohorts, and exposure pathways.

C. In addition, attached are two copies of a CD containing beta Version 0.98 of the 3MRA Model used to generate the outputs for the five chemicals. The 3MRA model can also be accessed at http://www.epa.gov/epa_ceam/wwwhtml/hwir.htm.

The Agency will provide a more detailed description of the changes made to the 3MRA model together with additional chemical-specific results obtained using beta Version 0.98 of the model in a subsequent Notice of Data Availability to be published in the Federal Register.

REFERENCES

Cowherd, C., Muleski, G. E., Englehart, P. J., and Gillette, D. A. Rapid Assessment of Exposure to Particulate Emissions from Surface Contamination Sites, EPA/600/8-85/002, Office of Health and Environmental Assessment, Office of Research and Development, February 1985, 11 page(s).

US EPA, 1999. Risk Characterization Report for the HWIR99 Multimedia, Multipathway and Multireceptor Risk assessment (3MRA). U.S. EPA (Environmental Protection Agency), Office of Solid Waste, October 1999, 176 page(s).

Attachments

1. Results Using 3MRA Model Beta Version 0.98
2. CD Containing 3MRA Model Beta Version 0.98

ATTACHMENT 1

Tables of HWIR Results for Five Chemicals Using 3MRA Model Beta Version 0.98

1. RESULTS FOR PROTECTION GROUPS:

PG1. All Protection Groups: Solids
PG2. All Protection Groups: Liquids
PG3. All Protection Groups: Semi-Solids

PG4. All Protection Groups: Landfills
PG5. All Protection Groups: Waste Piles

PG6. All Protection Groups: Aerated Tanks
PG7. All Protection Groups: Surface Impoundments

PG8. All Protection Groups: Land Application Units

2. RESULTS FOR SUB-POPULATIONS:

SP1. All Sub-Populations: Solids
SP2. All Sub-Populations: Liquids
SP3. All Sub-Populations: Semi-Solids

SP4. All Sub-Populations: Landfills
SP5. All Sub-Populations: Waste Piles

SP6. All Sub-Populations: Aerated Tanks
SP7. All Sub-Populations: Surface Impoundments

SP8. All Sub-Populations: Land Application Units.

3. RESULTS FOR COHORTS:

CO1. All Cohorts: Solids
CO2. All Cohorts: Liquids
CO3. All Cohorts: Semi-Solids

CO4. All Cohorts: Landfills
CO5. All Cohorts: Waste Piles

CO6. All Cohorts: Aerated Tanks
CO7. All Cohorts: Surface Impoundments

CO8. All Cohorts: Land Application Units

4. RESULTS FOR EXPOSURE PATHWAYS:

EP1. All Exposure Pathways: Solids
EP2. All Exposure Pathways: Liquids
EP3. All Exposure Pathways: Semi-Solids

EP4. All Exposure Pathways: Landfills
EP5. All Exposure Pathways: Waste Piles

EP6. All Exposure Pathways: Aerated Tanks
EP7. All Exposure Pathways: Surface Impoundments

EP8. All Exposure Pathways: Land Application Units